Rental Market in Singapore

An analysis on the price, demand and supply of rental flats

Presented by: Tan Yi Ting

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Introduction

Motivation behind the analysis and dataset

01

Scenario

Meet George

A foreigner who would be working in Singapore for the next few years.

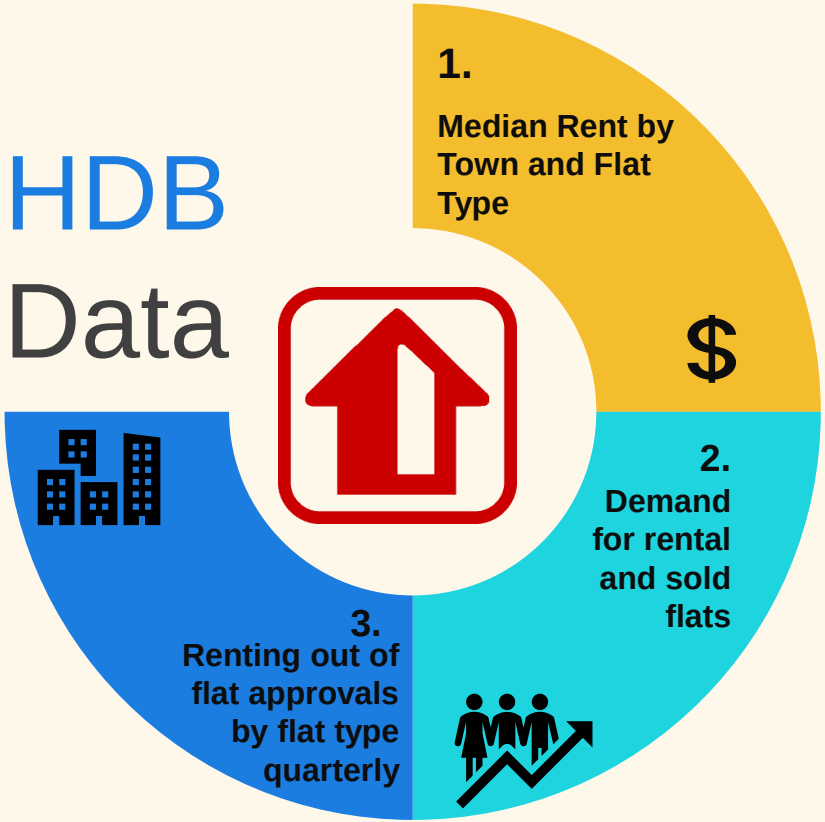
George is looking into the possibility of bringing his family to Singapore if it is within his budget.

He decided to research the rental market of Singapore to make a sound decision.

He would need three sets of data: price, demand and supply.

01

Dataset



George obtained 3 datasets from the Housing and Development Board

1. **Median Rent by Town and Flat Type**

https://data.gov.sg/dataset/median-rent-by-town-and-flat-type

2. Demand for Rental and Sold flats

https://data.gov.sg/dataset/key-stats-since-1960-demand-for-rental-and-sold-flats

3. Renting out of flat approvals by flat type quarterly

https://data.gov.sg/dataset/number-of-renting-out-of-flat-approvals-by-flat-type-quarterly

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Median Rent by Flat Type

Median Rent data and statistical overview, process and analysis

02 Overview

Data

- **4 columns:**
  - Quarter: 62 unique values
  - Town: 27 unique values
  - Flat type: 6 unique values
  - Median rent: 184 unique values
- **9,717 rows in the dataset**
- **Data are from the year of 2005 to 2020**
- **6 flat type:** 1- Room, 2-Room, 3-Room, 4-Room, 5-Room, Executive
- **Missing values** (all 1-room)

Statistic

- Rental price range from $700 to $3,600
- Mean: $2,009.67
- Median: $2,000
- Standard Deviation: $506.29

04 Process

1.

Setting up and understanding Data

- Import packages – Numpy and Matplotlib
- Import data: np.genfromtxt()
  - integer: price
  - string: quarter, town, type
- Finding total rows and unique value: len()
- Check for missing value: for loop if price == -1
- Remove missing value by slicing price column != -1

2.

Statistic

- Year range of the data: for loop to extract year from qtr, which is the first 4 element → min(year), max(year)
- Mean: price_column.mean()
- Median: np.median(price column)
- Standard deviation: np.std(price column)

3.

Graph

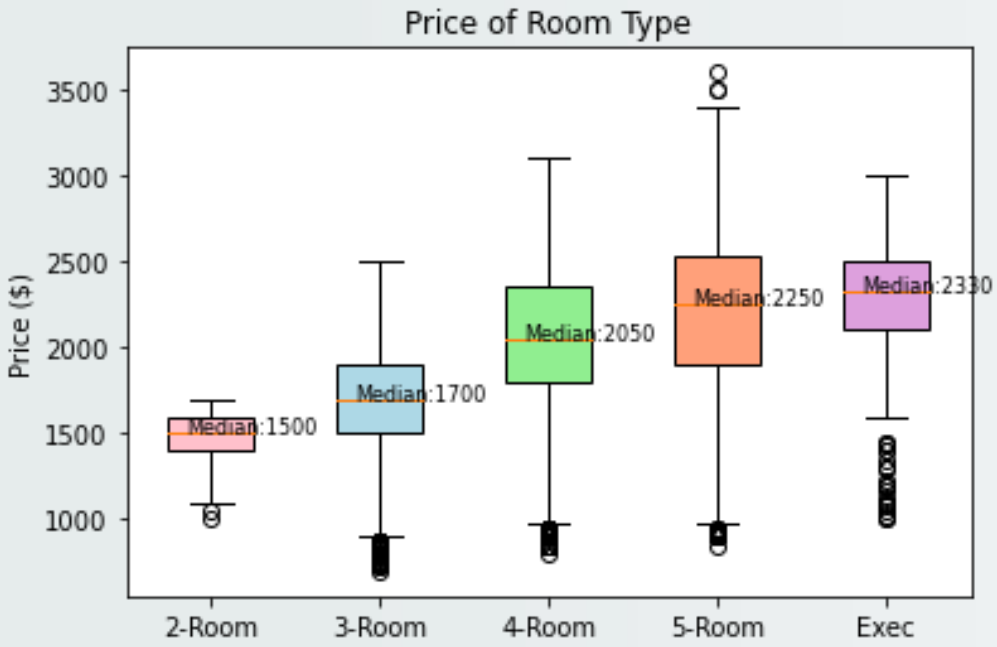
Box plot:

- Get the price data according to room type by slicing
- Box plot: plt.boxplot()
- Customisation: change colour using for loop → .set_facecolor()
- Label median: for loop box_plot[‘medians] → .get_xdata() for position → plt.text
- Labelling and title: plt.title(), plt.ylabel()

Line plot:

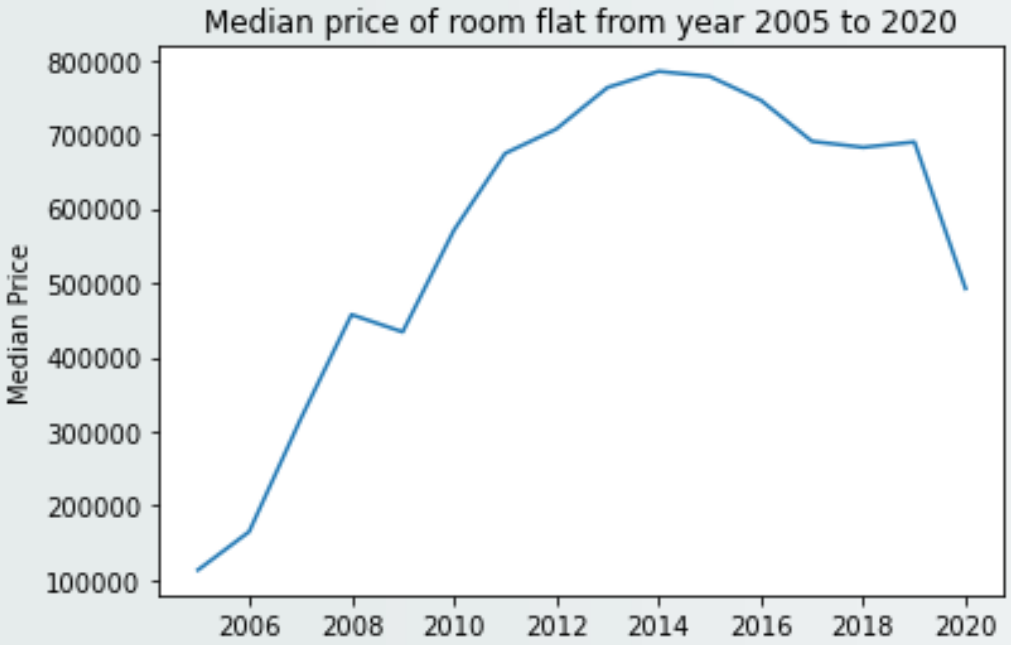
- Extract year from quarter column using for loop → replace quarter column with year
- Sum price based on year into array: np.bincount(), np.searchsorted()
- Line plot: plt.plot(), plt.ylabel, plt.title()

01 Analysis



- Due to the presence of outliers, median is a more accurate center of measure
- Median price difference is large from 3-room to 4-room flats
- Median price difference between 5-room to executive flat is $80. Which is a good deal for more space
- However, 5-room flat has a larger variability in price. Hence, it is possible to find a price range of below $2,250.

01 Analysis



- 2005 and 2020 data is incomplete with data only 3 quarter data
- Median price generally increased from year 2006 to 2019
- Drop in median price in year 2009 and 2015 -2017

Demand for rental flats

Data and statistical overview, process and analysis

03 Overview

Data

- **4 columns:**

- Start year: 13 unique values

- End year: 13 unique values

- Flat type: 2 unique values

- Demand: 26 unique values

- **No missing values**
- **Data are from the year of 1960 to 2019**
- **Demand from each row is the sum of 5 years of data** (inconsistent)
- **2 flat type:** Home ownership and rental

Extract data from 2006 onwards and rental flats

Statistic

2006 – 2019 Data:

- Mean: $16,600
- Median: $17,292
- Standard Deviation: $5,442

03 Process

1.

Setting up and understanding Data

- Import packages – Numpy and Matplotlib
- Import data: np.genfromtxt()
  - integer: start year, end year, demand
  - string: type
- Finding total rows and unique value: len()
- Check for missing value: for loop if demand == -1
- Extract dataset of interest which is from 2006 onwards
- Check if year interval in each row is consistent: for loop to check if it is the same as first row interval = 5

2.

Statistic

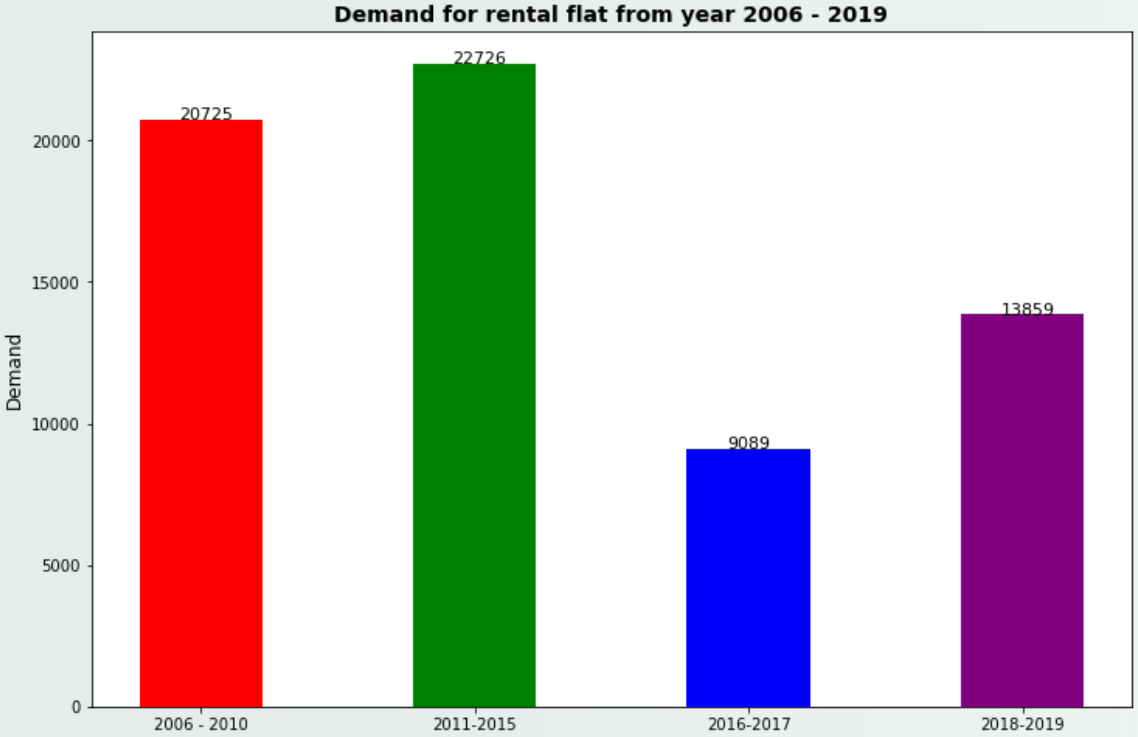
- Year range of the data: min(start_year), max(end_year)
- Mean: demand_column.mean()
- Median: np.median(demand column)
- Standard deviation: np.std(demand column)

3.

Graph

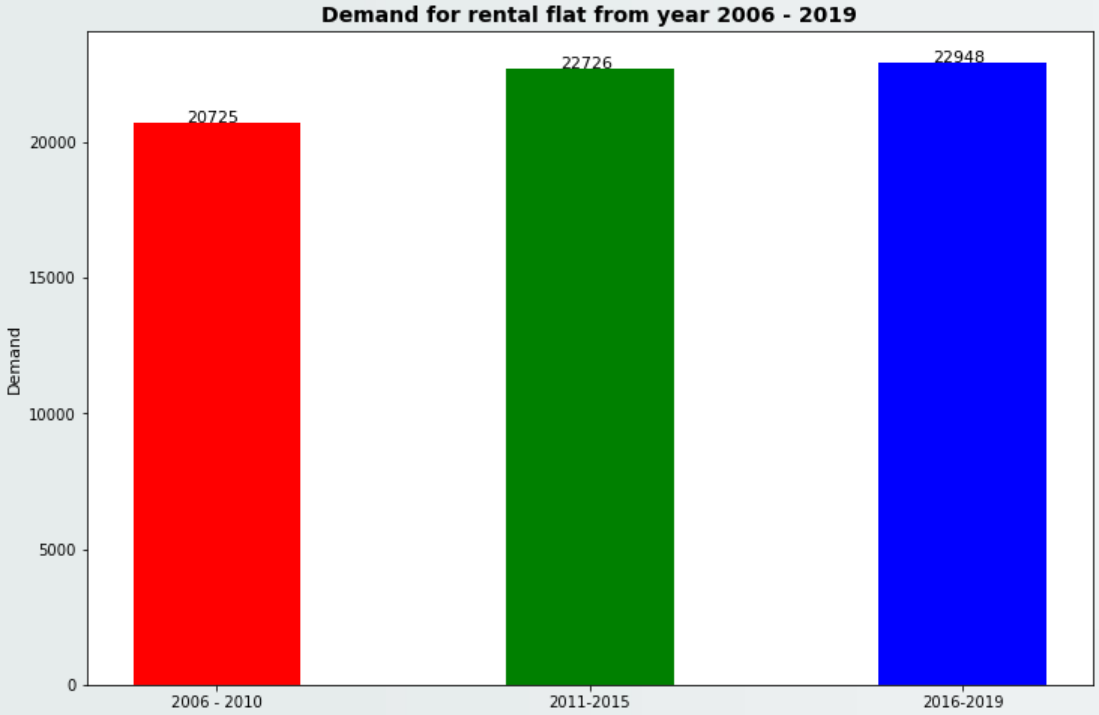
- Extract year and demand into a 1-d numpy array respectively
- Bar plot: plt.bar(), change width, change color
- Labelling and title: y.label, plt.title
- Total demand for each bar plot label: for loop demand to include plt.text(x-position, y-position, label)
- Combined year 2016-2019 data for a second bar plot

03 Analysis



- Demand increased by ~ 9.7% from the interval of 2006 to 2015
- Due to the data inconsistency of year interval, we are unable to conclude the trend for year 2015 - 2019
- Demand increased from 2016 to 2019 by ~52%

03 Analysis



- Combining 2016-2019 demand would be a more accurate representative of the trend
- Demand for rental flat in 2016-2019 is the highest despite only containing 4 years of data
- Thus, we can conclude that demand for rental flat increase from 2011- 2019

Supply for rental flats

Rental flat approval data and statistic overview, process and analysis

04 Overview

Data

- **3 columns:**

- Quarter: 54 unique values

- Flat type: 6 unique values

- Approval: 262 unique values

- **No missing values**
- **Data are from the year of 2007 to 2020**
- **324 rows in the dataset:**
  - 6 types * 14 years * 4 quarters = 336
  - Incomplete data in year 2020 (till Q2)
- **6 flat type:** 1- Room, 2-Room, 3-Room, 4-Room, 5-Room, Executive

Statistic

- Mean: 1,346
  - 1- room: 3
  - 2- room : 96
  - 3- room : 1,991
  - 4- room: 2,672
  - 5- room: 1,991
  - Executive: 563
- Median: 812
- Standard Deviation: 1,345

04 Process

1. Setting up and understanding Data

- Import packages – Numpy and Matplotlib
- Import data: np.genfromtxt()
  - integer: approval
  - string: quarter, type
- Finding total rows and unique value: len()
- Check for missing value: for loop if approval == -1

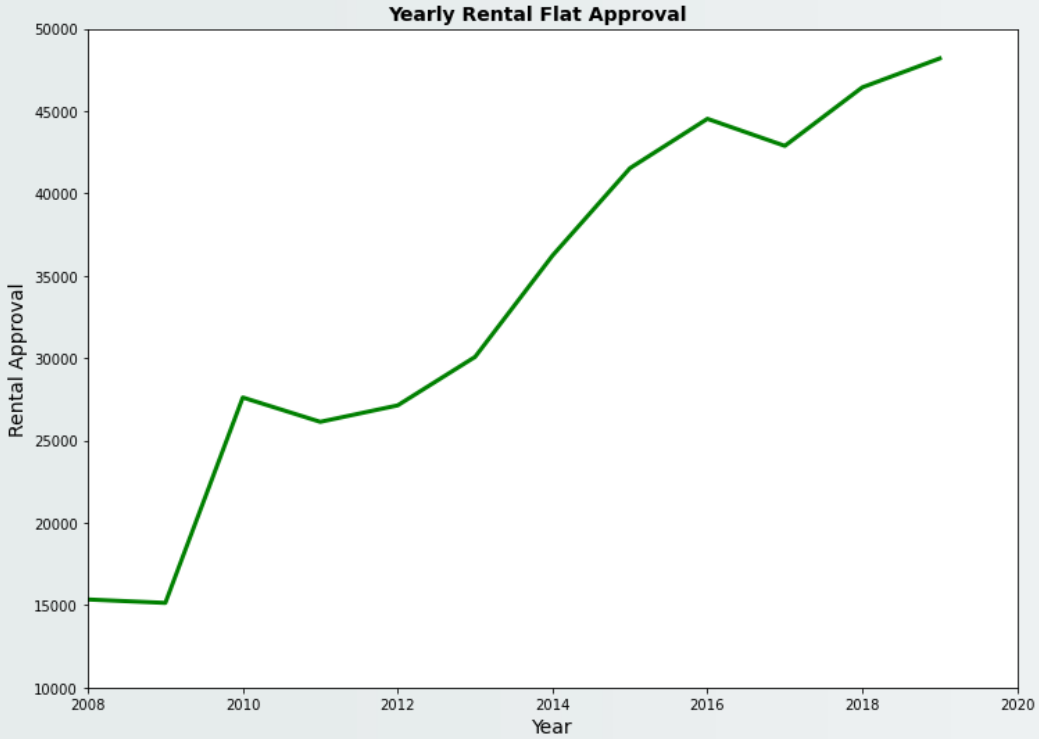
2. Statistic

- Year range of the data: for loop to extract year from qtr, which is the first 4 element → min(year), max(year)
- Mean: for loop to slice each room type → . mean()
- Median: np.median(approval column)
- Standard deviation: np.std(demand column)

3. Graph

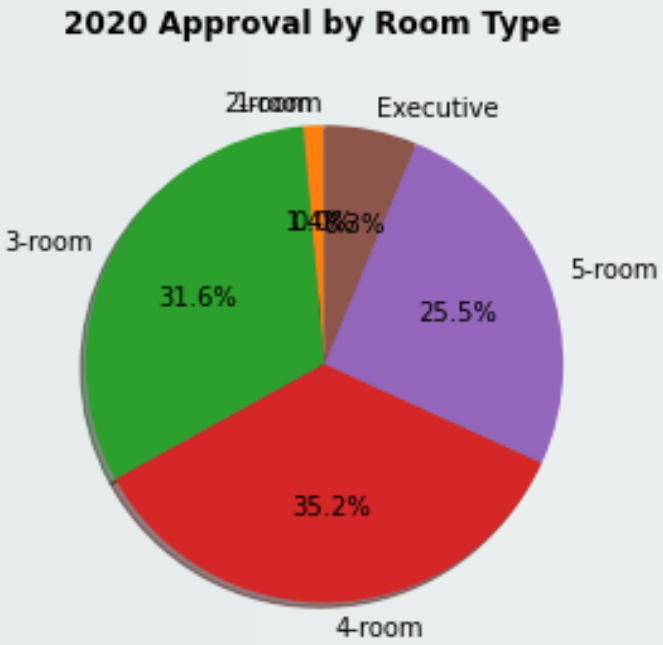
- Get yearly approval rental by combining quarter data into year. For loop for range of 14 years, combining 24 rows (6 type * 4qtr = 24)
- Remove year 2020 due to incomplete data
- Sub plot for customization: fig.subplots_adjust()
- Labelling and title: fig.suptitle(), ax.set_x_label(), ax.set_ylabel()
- Line plot: plt.plot(), change width, change color
- Pie chart by room type: slice each room type for year 2020 and combine into array → plt.pie()

04 Analysis



- Upward trend: Increasing supply of rental flat from 2008 to 2018
- Sharp increase from 2009 to 2010 from ~15,000 to 27,500 approval
- Rental flat approval decreased in year 2011 and 2017

04 Analysis

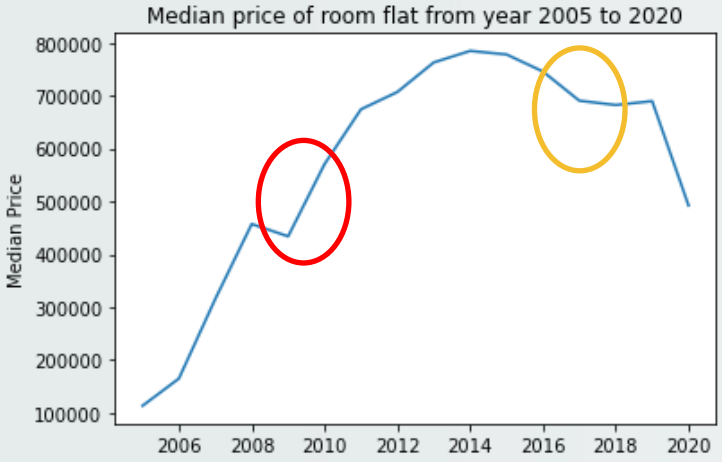


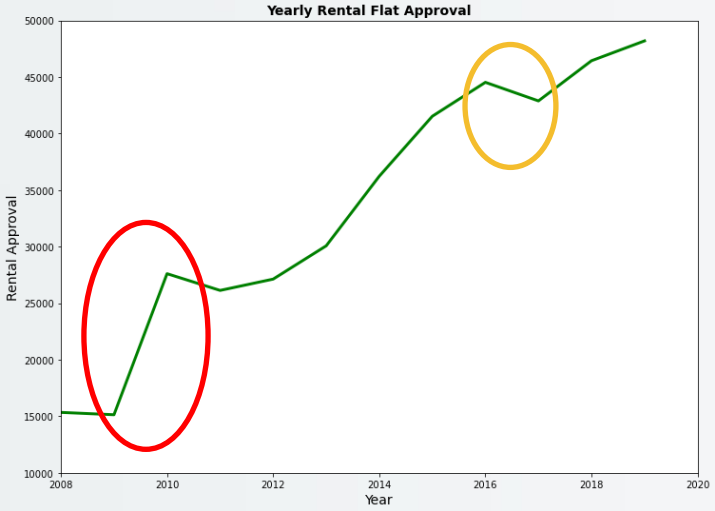
The majority of the rooms that are available for rental in the market are 4-room and 3-room flats.

Conclusion

Combining insights from all the analysis

05 Combining Trends





Assume demand increases every year.

<u>Comparing Price and Supply Movement:</u>

- **2009 – 2010:** Sharp increase in supply and median rental price
- **2016 – 2017:** Decrease in median price and supply

Conclusion: Rental market in Singapore does not seems to follow the conventional demand and supply theory (higher supply leads to lower price).
Supply in the rental market is sensitive to price changes.

05

Conclusion

The rental market has more supply than demand.

George may have a price advantage in negotiating for rental price, especially for 4-room or 3-room flats.

The price difference for 4-room and 5-room flats is reasonable (difference in median is $200).

George is looking to spend between $2,000 to $2,500 on rental.

George decided to look for 4-rooms flats in Singapore for him and his family.

Thank you